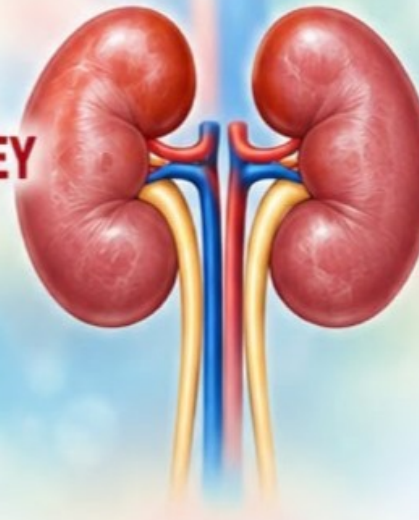
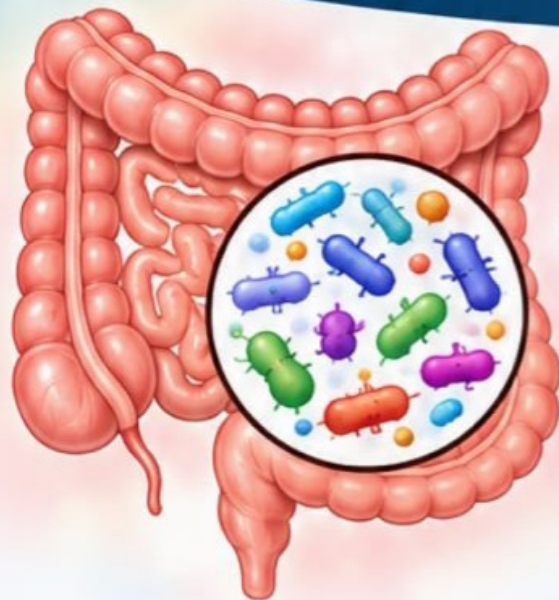


GUT AND KIDNEY

A Two-way Relationship

Same
Microbes
Common Destiny



Uremic toxins



Gut barrier



Inflammation



Cardiovascular
risk



CKD progression

*Healthy Gut
Healthier Kidneys*

Q1

How does CKD alter the gut microbiome, and why is this clinically important?



- ↓ SCFA-producing bacteria
- ↑ Urease, uricase and indole-producing organisms
- Impaired gut barrier
- ↑ Uremic toxins and inflammation

Q2

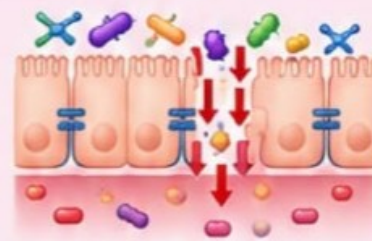
Which important gut-derived uremic toxins accumulate in CKD?

- Indoxyl sulfate
- p-Cresyl sulfate
- TMAO
- High protein binding (hard to dialyze)
- Associated with cardiovascular risk and CKD progression



Q3

What is the "leaky gut" concept in CKD?



- Uremia disrupts tight junctions
- Increased intestinal permeability
- Translocation of bacterial products (e.g. endotoxin)
- Contributes to systemic inflammation and cardiovascular complications

Q4

Can manipulation of the gut microbiome become a treatment for CKD?

- Dietary fiber (where appropriate)
- Prebiotics (e.g. inulin)
- Probiotics (e.g. Lactobacillus, Bifidobacterium)
- Synbiotics
- Other approaches (e.g. AST-120, targeted microbiome therapies)
- Promising but conclusive evidence for improved clinical outcomes is still limited.